

What is claimed:

1. An isolated nucleic acid molecule comprising the nucleotide sequence set  
5 forth in SEQ ID NO:1 or 3.

2. An isolated nucleic acid molecule encoding a polypeptide comprising the  
amino acid sequence set forth in SEQ ID NO: 2 or 4.

10 3. An isolated nucleic acid molecule which encodes a naturally occurring allelic  
variant of a polypeptide comprising the amino acid sequence set forth in SEQ ID NO: 2 or 4.

15 4. An isolated nucleic acid molecule comprising a nucleotide sequence which is  
at least 50% identical to the nucleotide sequence of SEQ ID NO:1 or 3 or a complement  
thereof selected from the group consisting of;

a) a nucleic acid molecule comprising a fragment of at least 500 nucleotides of a  
nucleic acid comprising the nucleotide sequence of SEQ ID NO:1 or 3 complement thereof;

20 b) a nucleic acid molecule which encodes a polypeptide comprising an amino  
acid sequence at least about 50% homologous to the amino acid sequence of SEQ ID NO:2  
or 4; and

c) a nucleic acid molecule which encodes a fragment of a polypeptide  
comprising the amino acid sequence of SEQ ID NO:2 or 4, wherein the fragment comprises  
at least 15 contiguous amino acid residues of the amino acid sequence of SEQ ID NO:2 or 4.

25 5. An isolated nucleic acid molecule which hybridizes to the nucleic acid  
molecule of any one of claims 1, 2, 3, or 4 under stringent conditions.

30 6. An isolated nucleic acid molecule comprising a nucleotide sequence which is  
complementary to the nucleotide sequence of the nucleic acid molecule of any one of claims  
1, 2, 3, or 4.

7. An isolated nucleic acid molecule comprising the nucleic acid molecule of  
any one of claims 1, 2, 3, or 4, and a nucleotide sequence encoding a heterologous  
polypeptide.

8. A vector comprising the nucleic acid molecule of any one of claims 1, 2, 3, or 4.

5 9. The vector of claim 8, which is an expression vector.

10. A host cell transfected with the expression vector of claim 9.

10 11. A method of producing a polypeptide comprising culturing the host cell of claim 10 in an appropriate culture medium to, thereby, produce the polypeptide.

12. An isolated polypeptide selected from the group consisting of:

15 a) a fragment of a polypeptide comprising the amino acid sequence of SEQ ID NO:2 or 4, wherein the fragment comprises at least 15 contiguous amino acids of SEQ ID NO:2 or 4;

b) a naturally occurring allelic variant of a polypeptide comprising the amino acid sequence of SEQ ID NO:2 or 4, wherein the polypeptide is encoded by a nucleic acid molecule which hybridizes to a nucleic acid molecule consisting of SEQ ID NO: 1 or 3 under stringent conditions;

20 c) a polypeptide which is encoded by a nucleic acid molecule comprising a nucleotide sequence which is at least 50 % identical to a nucleic acid comprising the nucleotide sequence of SEQ ID NO:1 or 3;

d) a polypeptide comprising an amino acid sequence which is at least 50% identical to the amino acid sequence of SEQ ID NO:2 or 4.

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13. The isolated polypeptide of claim 12 comprising the amino acid sequence of SEQ ID NO:2 or 4.

30 14. The polypeptide of claim 13, further comprising heterologous amino acid sequences.

15. The polypeptide of claim 14, wherein the heterologous amino acid sequences are derived from an immunoglobulin molecule.

16. The polypeptide of claim 14, wherein the polypeptide comprises from about amino acids 19-245 or SEQ ID NO:2 or from about amino acids 19-238 of SEQ ID NO: 4.

17. An antibody which selectively binds to a polypeptide of claim 12.

18. A method for modulating the immune response comprising administering a B7-4 polypeptide to a subject such that the immune response of the subject is modulated.

19. The method of claim 18, wherein the immune response is upmodulated.

20. The method of claim 18, wherein the immune response is downmodulated.

21. A method for modulating the immune response comprising administering an antibody which binds to a B7-4 polypeptide to a subject such that the immune response of the subject is modulated.

22. The method of claim 21, further comprising administering at least one antibody which binds to a B7-1 or B7-2.

23. A method for modulating T cell costimulation comprising contacting an activated T cell with a B7-4 polypeptide such that T cell costimulation is modulated.

24. A method for detecting the presence of a polypeptide of claim 12 in a sample comprising:

- a) contacting the sample with a compound which selectively binds to the polypeptide; and
- b) determining whether the compound binds to the polypeptide in the sample to thereby detect the presence of a polypeptide of claim 12 in the sample.